



7A5-scFv

1 TCCACCACTCTCGACTCAAGAAAGCTCCTGACAACCAAGAAGA ATG GAC TGT CTC ACC AAC CTC CGA TCC 70
1 M D C L T N L R S 9

71 GCT GAG GGT AAA GTT GAC CAG GCG AGC AAA ATC CTA ATT CTC CTT GTG GCT TGG TGG GGG 130
10 A E G K V D Q A S K I L I L L V A W W G 29

131 TTT GGG ACC ACT GCC GAA GTT TCG ACT GCC CGA GCG GCC CAG CCG GCC ATG GCC GAG GTC 190
30 F G T T A E V S T A R A A Q P A M A E V 49

191 AAG CTG CAG CAG TCA GGG GCT GAG CTG GTG AGG CCT GGG GTC TCA GTG AAG ATT TCC TGC 250
50 K L Q Q S G A E L V R P G V S V K I S C 69

251 AAG GGT TCT GGC TAC ACA TTC ACT GAT TAT GGT ATG AGC TGG GTG AAA CAG AGT CAT GCA 310
70 K G S G Y T F T D Y G M S W V K Q S H A 89

311 AAG AGT CTA GAG TGG ATT GGA CTT ATT AGT ACT TAC TAT GGT GAT CCT AGT TAC AAC CAG 370
90 K S L E W I G L I S T Y Y G D P S Y N Q 109

371 AGG TTC AAG GGC AAG GCC ACA ATG ACT GTA GAC AAA TCC TCC AAC ACA GCC TAT TTG GAA 430
110 R F K G K A T M T V D K S S N T A Y L E 129

431 CTT GCC AGA CTG ACA TCT GAG GAT TCT GCC ATT TAT TAT TGT GCA AGA TCG GAT GGT AAT 490
130 L A R L T S E D S A I Y Y C A R S D G N 149

491 TAC GGG TAT TAC TAT GCT TTG GAC TAC TGG GGC CAA GGC ACT ACG GTC ACC GTC TCC TCA 550
150 Y G Y Y Y A L D Y W G Q G T T V T V S S 169

551 GGT GGA GGC GGT TCA GGC GGA GGT GGC TCT GGC GGT GGC GGA TCG GAT ATC GAG CTC ACT 610
170 G G G G S G G G G S G G G G S D I E L T 189

611 CAG TCT CCA TCT TCT TTG GCT GTG TCT CTA GGG CAG AGG GCC ACC ATA TCC TGC AGA GCC 670
190 Q S P S S L A V S L G Q R A T I S C R A 209

671 AGT GAA AGT GTT GAT AGT TAT GGC GAT AGT TTT ATG CAC TGG TAT CAG CAG AAA CCA GGA 730
210 S E S V D S Y G D S F M H W Y Q Q K P G 229

731 CAG CCA CCC AAA CTC CTC ATC TAT CGT GCA TCC AAC CTA GAA TCT GGA GTC CCT GCC AGG 790
230 Q P P E L L I Y R A S N L E S G V P A R 249

791 TTC AGT GGC AGT GGG TCT GAG TCA GAC TTC ACT CTC ACC ATC GAT CCT GTG GAG GAA GAT 850
250 F S G S G S E S D F T L T I D P V E E D 269

851 GAT GCT GCA GTG TAT TAC TGT CTG CAA AGT ATG GAA GAT CCG TAC ACG TTC GGA GGG GGG 910
270 D A A V Y Y C L Q S M E D P Y T F G G G 289

911 ACC AAG CTG GAA ATA AAA CGG GCG GCC GCA TCG GGC TCC GGG GGC GGT GGT TCT GGT GGT 970
290 T K L E I K R A A A S G S G G G G S G G 309

971 GGT TCT GGT GGT GGT GGT TCT GGT GGT GGT TCT GGC GCC AGC CCA GTC CAG TTT ATC 1030
310 G S G G G G S G G G G S G A S P V Q F I 329

FIG. 1

(SEQ ID NO: 1)

(SEQ ID NO: 6)

K6-scFv

▶ SNV-env Leader

1	ATG GAC TGT CTC ACC AAC CTC CGA TCC	27
1	M D C L T N L R S	9
28	GCT GAG GGT AAA GTT GAC CAG GCG AGC AAA ATC CTA ATT CTC CTT GTG GCT TGG TGG GGG	87
10	A E G K V D Q A S K I L I L L V A W W G	29
	Sfi I ▶ K6-scFv	
88	TTT GGG ACC ACT GCC GAA GTT TCG ACT GCC CGA GCG GCC CAG CCG GCC ATG GCC GAG GTC	147
30	F G T T A E V S T A R A A Q P A M A E V	49
148	AAG CTG CAG GAG TCA GGG ACT GAA CTT GTG AAG CCT GGG GCT TCA GTG AAT CTG TCT TGC	207
50	K L Q E S G T E L V K P G A S V N L S C	69
208	AAG GCT TCT GGC TAC ACC TTC ACC AGC TAC TGG ATG CAC TGG TTG AAG CAG AGG CCT GGA	267
70	K A S G Y T F T S Y W M H W L K Q R P G	89
268	CAA GGC CTT GAG TGG ATC GGA GAG ATT GAT CCT GTT GAT AGT TAT ACT AAC TAC AAT CAA	327
90	Q G L E W I G E I D P V D S Y T N Y N Q	109
328	AAC TTC AAG GGC AAG GCC ACA CTG ACT GTA GAC AAG TCC TCC ACC ACA GTC TAC ATG CAC	387
110	N F K G K A T L T V D K S S T T V Y M H	129
388	CTC AGC AGC CTG ACA TCT GAG GAC TCT GCG GTC TAT TAC TGT GCA AGA AAG GGC TAT GCT	447
130	L S S L T S E D S A V Y Y C A R K G Y A	149
448	ATG GAC TAC TGG GGC CAA GGG ACC AAC GTC ACC GTC TCC TCA GGT GGA TGC GGT TCA GGC	507
150	M D Y W G Q G T N V T V S S G G C G S G	169
508	GGA GGT GGC TCT GGC GGT GGC GGA TCG GAC ATC GAG CTC ACT CAG TCA CCA GCA ATC ATG	567
170	G G G S G G G S D I E L T Q S P A I M	189
568	TCT GCA TCT CCA GGG GAG AAG GTC ACC ATG ACC TGC AGT GCC AGC TCA AGT ATA AGT TAC	627
190	S A S P G E K V T M T C S A S S S I S Y	209
628	ATG CAC TGG TAC CAG CAG AAG CCA GGC ACC TCC CCC AAA AGA TGG ATT TAT GAC ACA TCC	687
210	M H W Y Q Q K P G T S P K R W I Y D T S	229
688	AAA CTG GCT TCT GGA GTC CCT GCT CGC TTC AGT GGC AGT GGG TCT GGG ACC TCT TAT TCT	747
230	K L A S G V P A R F S G S G S G T S Y S	249
748	CTC CCA ATC AGC AGC ATG GAG GCT GAA GAT GCT GCC ACT TAT TAC TGC CAT CAG CGG AGT	807
250	L P I S S M E A E D A A T Y Y C H Q R S	269
	Not I	
808	AGT TAC CCA TGG ACG TTC GGT GGA GGG ACC AAG CTG GAA ATA AAA CGG GCG GCC GCA TCG	867
270	S Y P W T F G G G T K L E I K R A A A S	289
868	GGC TCC GGG GGC GGT GGT TCT GGT GGT GGT TCT GGT GGT GGT TCT GGT GGT GGT GGT	927
290	G S G G G G S G G G S G G G S G G G G	309

FIG. 2

(SEQ ID NO: 2)

(SEQ ID NO: 7)

-SCFv

► SNV-env Leader

PG	GAC	TGT	CTC	ACC	AAC	CTC	CGA	TCC	GCT	GAG	GGT	AAA	GTT	GAC	CAG	GCG	AGC	AAA	ATC	60	
D	C	L	T	N	L	R	S	A	E	G	K	V	D	Q	A	S	K	I		20	
TA	ATT	CTC	CTT	GTG	GCT	TGG	TGG	GGG	TTT	GGG	ACC	ACT	GCC	GAA	GTT	TCG	ACT	GCC	CGA	120	
I	L	L	V	A	W	W	G	F	G	T	T	A	E	V	S	T	A	R		40	
		Sfi I																			
CG	GCC	CAG	CCG	GCC	ATG	GCC	CAG	GTG	CAG	CTG	CAG	CAG	TCT	GGG	ACT	GAA	CTG	GCA	ACA	180	
A	Q	P	A	M	A	Q	V	Q	L	Q	Q	S	G	T	E	L	A	T		60	
CT	GGG	GCC	TCA	GTG	AGG	ATG	TCC	TGC	AAG	GCT	TCT	GGC	TAC	GCC	TTT	ACT	ACC	TAC	TGG	240	
G	A	S	V	R	M	S	C	K	A	S	G	Y	A	F	T	T	Y	W		80	
ATG	CAC	TGG	GTA	AAA	CAG	AGG	CCT	GGA	CAG	GGT	CTG	GAA	TGG	ATT	GGA	TAC	ATT	AAT	CCT	300	
I	H	W	V	K	Q	R	P	G	Q	G	L	E	W	I	G	Y	I	N	P	100	
301	ACC	ACT	GAT	TAT	ACT	GAC	TAC	AAT	CTG	AAG	TTC	AAG	GAC	AAG	GCC	ACA	TTG	ACT	GCA	GAC	360
101	T	T	D	Y	T	D	Y	N	L	K	F	K	D	K	A	T	L	T	A	D	120
361	AAA	TCC	TCC	AGT	ACA	GCC	TAC	ATG	CAA	CTG	AGC	AGC	CTG	ACA	TCT	GAG	GAC	TCT	GCA	GTC	420
121	K	S	S	S	T	A	Y	M	Q	L	S	S	L	T	S	E	D	S	A	V	140
421	TAT	TAC	TGT	GCA	AGA	TCG	GGG	TGG	TCC	TAT	GCT	ATG	GAC	TAC	TGG	GGG	CAA	GGG	ACC	ACG	480
141	Y	Y	C	A	R	S	G	W	S	Y	A	M	D	Y	W	G	Q	G	T	T	160
481	GTC	ACC	ATC	TCC	TCA	GGT	GGA	GGC	GGT	TCA	GGC	GGA	GGT	GGC	TCT	GGC	GGT	GGC	GGA	TCG	540
161	V	T	I	S	S	G	G	G	G	S	G	G	G	G	S	G	G	G	G	S	180
541	GAC	ATC	GAG	CTC	ACT	CAG	TCT	CCA	GCA	ATC	ATG	TCT	GCA	TCT	CCA	GGG	GAG	AAG	GTC	ACC	600
181	D	I	E	L	T	Q	S	P	A	I	M	S	A	S	P	G	E	K	V	T	200
601	ATA	ACC	TGC	AGT	GCC	AGC	TCA	AGT	GTA	AGT	TAC	ATG	CAC	TGG	TTC	CAG	CAG	AAG	CCA	GGC	660
201	I	T	C	S	A	S	S	S	V	S	Y	M	H	W	F	Q	Q	K	P	G	220
661	ACT	TCT	CCC	AAA	CTC	TGG	ATT	TAT	AGC	ACA	TCC	AAC	CTG	GCT	TCT	GGA	GTC	CCT	GCT	CGC	720
221	T	S	P	K	L	W	I	Y	S	T	S	N	L	A	S	G	V	P	A	R	240
721	TTC	AGT	GGC	AGT	GGA	TCT	GGG	ACC	TCT	TAC	TCT	CTC	ACA	ATC	AGC	CGA	ATG	GAG	GCT	GAA	780
241	F	S	G	S	G	S	G	T	S	Y	S	L	T	I	S	R	M	E	A	E	260
781	GAT	GCT	GCC	ACT	TAT	TAC	TGC	CAG	CAA	AGG	AGT	AGT	TAC	CCA	TTC	ACG	TTC	GGC	TCG	GGC	840
261	D	A	A	T	Y	Y	C	Q	Q	R	S	S	Y	P	F	T	F	G	S	G	280
841	ACC	AAG	CTG	GAA	ATC	AAA	CGG	GCG	GCC	GCA	TCG	GGC	TCC	GGG	GGC	GGT	GGT	TCT	GGT	GGT	900
281	T	K	L	E	I	K	R	A	A	A	S	G	S	G	G	G	G	S	G	G	300
901	GGT	GGT	TCT	GGT	GGT	GGT	GGT	TCT	GGT	GGT	GGT	GGT	TCT	GGC	GCC	AGC	CCA	GTC	CAG	TTT	960
301	G	G	S	G	G	G	G	S	G	G	G	G	S	G	A	S	P	V	Q	F	320
961	ATC	CCC	CTG	CTT	GTG	GGT	CTA	GGG	ATT	TCA											990
321	I	P	L	L	V	G	L	G	I	S											330

FIG. 3

(SEQ ID NO: 3)
 (SEQ ID NO: 8)

7E4-scFv

► SNV-env Leader

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1 ATG GAC TGT CTC ACC AAC CTC CGA TCC GCT GAG GGT AAA GTT GAC CAG GCG AGC AAA ATC 60
1 M D C L T N L R S A E G K V D Q A S K I 20

61 CTA ATT CTC CTT GTG GCT TGG TGG GGG TTT GGG ACC ACT GCC GAA GTT TCG ACT GCC CGA 120
21 L I L L V A W W G F G T T A E V S T A R 40

      Sfi I      ► 7E4-scFv
121 GCG GCC CAG CCG GCC ATG GCC GAG GTC AAG CTG CAG CAG TCA GGG GCT GAG CTG GTG AGG 180
41 A A Q P A M A E V K L Q Q S G A E L V R 60

181 CCT GGA GCT TCA GTG AAG CTG TCC TGC AAG ACT TCT GGC TTC TCC TTC ACC AGC TAC TGG 240
61 P G A S V K L S C K T S G F S F T S Y W 80

241 ATG AAC TGG GTG AAG CTG AGG CCT GGA CAA GGC CTT GAG TGG ATT GGC ATG ATT CAT CCT 300
81 M N W V K L R P G Q G L E W I G M I H P 100

301 TCC GAT AGT GAA ACT AGT TTA ACT CAG AGG TTC AAG GAC AAG GCC ACA CTG ACT GTA GAC 360
101 S D S E T S L T Q R F K D K A T L T V D 120

361 AAA TCC TCC AGC ACA GCC TAC ATG CAA CTC AGC AGC CCG ACA TCT GAG GAC TCT GCG GTC 420
121 K S S S T A Y M Q L S S P T S E D S A V 140

421 TAT TAC TGT GCA AGA TCT CTT TAT GCT AAC TAC CCC TCC TGG TTT ACT TAC TGG GGC CAA 480
141 Y Y C A R S L Y A N Y P S W F T Y W G Q 160

481 GGC ACC ACG GTC ACC GTC TCC TCA GGT GGA GGC GGT TCA GGC GGA GGT GGC TCT GGC GGT 540
161 G T T V T V S S G G G G S G G G G S G G 180

541 GGC GGA TCG GAC ATC GAG CTC ACT CAG TCT CCA ACC ACC ATG GCT GCA TCT CCC GGG GAG 600
181 G G S D I E L T Q S P T T M A A S P G E 200

601 AAG ATC ACT ATC ACC TGC AGT GCC AGC TCA AGT ATA AGT TCC AAT TAC TTG CAT TGG TAT 660
201 K I T I T C S A S S S I S S N Y L H W Y 220

661 CAG CAG AAG CCA GGA TTC TCC CCT AAA CTC TTG ATT TAT AGG ACA TCC AAT CTG GCT TCT 720
221 Q Q K P G F S P K L L I Y R T S N L A S 240

721 GGA GTC CCA GCT CGC TTC AGT GGC AGT GGG TCT GGG ACC TCT TAC TCT CTC ACA ATT GGC 780
241 G V P A R F S G S G S G T S Y S L T I G 260

781 ACC ATG GAG GCT GAA GAT GTT GCC ACT TAC TAC TGC CAG CAG GGT AGT AGT ATA CCG TAC 840
261 T M E A E D V A T Y Y C Q Q G S S I P Y 280

      Not I
841 ACG TTC GGA GGG GGG ACC AAG CTG GAA ATA AAA CGG GCG GCC GCA TCG GGC TCC GGG GGC 900
281 T F G G G T K L E I K R A A A S G S G G 300

901 GGT GGT TCT GGT GGT GGT GGT TCT GGT GGT GGT GGT TCT GGT GGT G 946
301 G G S G G G G S G G G G S G G 315
  
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FIG. 4

(SEQ ID NO: 4)

(SEQ ID NO: 9)

6C3-scFv

		▶ SNV-env Leader																			
1	ATG	GAC	TGT	CTC	ACC	AAC	CTC	CGA	TCC	GCT	GAG	GGT	AAA	GTT	GAC	CAG	GCG	AGC	AAA	ATC	60
1	M	D	C	L	T	N	L	R	S	A	E	G	K	V	D	Q	A	S	K	I	20
61	CTA	ATT	CTC	CTT	GTG	GCT	TGG	TGG	GGG	TTT	GGG	ACC	ACT	GCC	GAA	GTT	TCG	ACT	GCC	CGA	120
21	L	I	L	L	V	A	W	W	G	F	G	T	T	A	E	V	S	T	A	R	40
		▶ 6C3-scFv																			
121	GCG	GCC	CAG	CCG	GCC	ATG	GCC	CAG	GTA	CAG	CTG	CAG	CAG	TCA	GGA	GCA	GAA	ATG	AAA	AAG	180
41	A	A	Q	P	A	M	A	Q	V	Q	L	Q	Q	S	G	A	E	M	K	K	60
181	CCC	GGG	GAG	TCT	CTG	AAA	ATC	TCC	TGT	AAG	GGT	TTT	GGA	TAC	GAC	TTT	AGC	ACC	TAC	TGG	240
61	P	G	E	S	L	K	I	S	C	K	G	F	G	Y	D	F	S	T	Y	W	80
241	ATC	GCC	TGG	GTG	CGC	CAG	ATG	CCC	GGG	AAA	GGC	CTG	GAG	TAC	ATG	GGG	CTC	ATC	TAT	CCT	300
81	I	A	W	V	R	Q	M	P	G	K	G	L	E	Y	M	G	L	I	Y	P	100
301	GGT	GAC	TCT	GAC	ACC	AAA	TAC	AGC	CCG	TCC	TTC	CAA	GGC	CAG	GTC	ACC	ATC	TCA	GCC	GAC	360
101	G	D	S	D	T	K	Y	S	P	S	F	Q	G	Q	V	T	I	S	A	D	120
361	AAG	TCC	ATC	AGC	ACC	GCC	TAC	CTG	CAG	TGG	AGC	AGC	CTG	AAG	GCC	TCG	GAC	ACC	GCC	ATG	420
121	K	S	I	S	T	A	Y	L	Q	W	S	S	L	K	A	S	D	T	A	M	140
421	TAT	TAC	TGT	GCG	AGA	GTC	TCT	GGA	TAT	TGT	AGT	AGT	ACC	AGC	TGC	TAT	GAC	TAC	TAC	TAC	480
141	Y	Y	C	A	R	V	S	G	Y	C	S	S	T	S	C	Y	D	Y	Y	Y	160
481	TAC	TAC	ATG	GAC	GTC	TGG	GGC	CGG	GGA	ACC	CTG	GTC	ACC	GTC	TCG	AGA	GGT	GGA	GGC	GGT	540
161	Y	Y	M	D	V	W	G	R	G	T	L	V	T	V	S	R	G	G	G	G	180
541	TCA	GGC	GGA	GGT	GGC	TCT	GGC	GGT	GGC	GGA	TCG	GAC	ATC	GTG	ATG	ACC	CAG	TCT	CCT	TCC	600
181	S	G	G	G	G	S	G	G	G	G	S	D	I	V	M	T	Q	S	P	S	200
601	ACC	CTG	TCT	GCA	TCT	GTA	GGA	GAC	AGA	GTC	ACC	ATG	ACT	TGC	CGG	GCC	AGT	CAG	AAC	ATT	660
201	T	L	S	A	S	V	G	D	R	V	T	M	T	C	R	A	S	Q	N	I	220
661	AAT	ATC	TGG	TTG	GCC	TGG	TAT	CAG	CAG	AAA	CCA	GGG	AAA	GCC	CCT	AAG	CTC	CTG	ATC	TAT	720
221	N	I	W	L	A	W	Y	Q	Q	K	P	G	K	A	P	K	L	L	I	Y	240
721	AAG	GCG	TCC	ACT	TTA	GAG	AGT	GGG	GTC	CCG	TCA	AGG	TTC	AGC	GGC	AGT	GGA	TCT	GGG	ACA	780
241	K	A	S	T	L	E	S	G	V	P	S	R	F	S	G	S	G	S	G	T	260
781	GAA	TTC	ACT	CTC	ACC	ATC	AGC	GGC	CTG	CAG	CCT	GAT	GAT	TTT	GCA	AGT	TAT	TAC	TGT	CAA	840
261	E	F	T	L	T	I	S	G	L	Q	P	D	D	F	A	S	Y	Y	C	Q	280
		Not I																			
841	CGG	TAT	GAT	AGT	GAC	TGG	TCG	TTC	GGC	CAA	GGG	ACC	AAG	CTG	GAG	ATC	AAA	CGT	GCG	GCC	900
281	R	Y	D	S	D	W	S	F	G	Q	G	T	K	L	E	I	K	R	A	A	300
901	GCA	TCG																			906
301	A	S																			302

FIG. 5

(SEQ ID NO: 5)
 (SEQ ID NO: 10)